
पुल हैंडल्स — विशिष्टि

Pull Handles — Specification

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BUREAU OF INDIAN STANDARDS
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Price Group 6

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Builder's Hardware Sectional Committee had been approved by the Civil Engineering Division Council.

This standard covers the requirements of manufacture, dimensions, performance and finish of pull handles of the type that are commonly fixed to doors.

The standard, IS 208 : 2020 'Door handles — Specification (*sixth revision*)' covers door handles of size up to 150 mm. In order to cater to higher sizes and keeping in view the technological advancement and market demand, this separate standard has been formulated, based on performance requirement of such big size handles, called pull handles.

Ergonomically, the proposed designs and specifications of pull handles are useful and used for doors, such as wooden, metal as well as glass doors. It may be required in residences, offices, commercial and industrial segments, etc.

The composition of the Committee responsible for the formulation of this standard is given at Annex C.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

PULL HANDLES — SPECIFICATION

1 SCOPE

This standard covers the requirements for manufacture, dimensions, performance and finish of pull handles of the type that are commonly fixed to doors.

2 REFERENCES

The standards given below contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards given below.

<i>IS No.</i>	<i>Title</i>
1068 : 1993	Electroplated coatings of nickel plus chromium and copper plus nickel plus chromium — Specification (<i>third revision</i>)
1378 : 1987	Specification for oxidised-copper finishes (<i>third revision</i>)
1868 : 1996	Anodic coatings on aluminum and its alloys — Specification (<i>third revision</i>)
4905 : 2015/ ISO 24153 : 2009	Random sampling and randomization procedures (<i>first revision</i>)
9844 : 1981	Methods of testing corrosion resistance of electroplated and anodized aluminium coatings by neutral salt spray test

3 TYPES, DIMENSION AND TOLERANCES OF PULL HANDLES

3.1 Pull handles are manufactured in two types according to their shape. The clear distance, *A* from door surface to the inner side of pull handle shall be minimum 30 mm for comfortable grip. The distance, *C* from door surface to the outer side of pull handle shall be maximum 100 mm for user safety.

3.1.1 D-Shape Pull Handle

Pull handles shall be manufactured with diameter, $\varnothing$ ranging from 19 mm to 38 mm and length, *L* ranging

from 150 mm to 2 400 mm. Typical details of D-shape pull handle are given in Fig. 1 and Table 1.

3.1.2 H-Shape Pull Handle

Pull handles shall be manufactured with diameter, $\varnothing$ ranging from 22 mm to 38 mm and length, *L* ranging from 250 mm to 2 400 mm. Typical details of H-shape pull handle are given in Fig. 2 and Table 2.

3.1.3 Other shapes and size of pull handles may also be manufactured as per the agreement between manufacturer and purchaser.

3.2 Tolerances

Tolerances to the dimensions of pull handles shall be ± 1 mm for all sizes and types of pull handles.

4 MANUFACTURE

4.1 Materials

Pull handles may be manufactured from any suitable material, such as steel, stainless steel, brass, bronze, aluminum, zinc alloys. However, the material selected shall not affect the quality and performance of pull handle, as specified in this standard.

4.2 Fitting Accessories and Installation

Pull handles should be easy to install and suitable for fitting to the doors such as glass, wooden and metal doors. All the fitting accessories required to install a pull handle shall be supplied with pull handle. Mostly back to back fixing system is used for pull handle installation. Fitting accessories may be manufactured from any suitable material such as steel, stainless steel, brass and LDPE. However, the material selected for fitting accessories shall not affect the quality and performance of pull handle. Generally the fitting accessories used for the installation of pull handles should be 4 nos of stainless steel washer, 4 nos of LDPE washer, 2 nos of grub screws and 2 nos of fitting studs. The recommended dimensions of D-shape pull handles with their recommended fitting accessories are given in Table 1, Fig. 3 and Fig. 5. The recommended dimensions of H-shape pull handle with their recommended fitting accessories are given in Table 2, Fig. 4 and Fig. 5.

4.3 The pull handles should be free from defects and all sharp edges should be removed so as to facilitate easy handling.

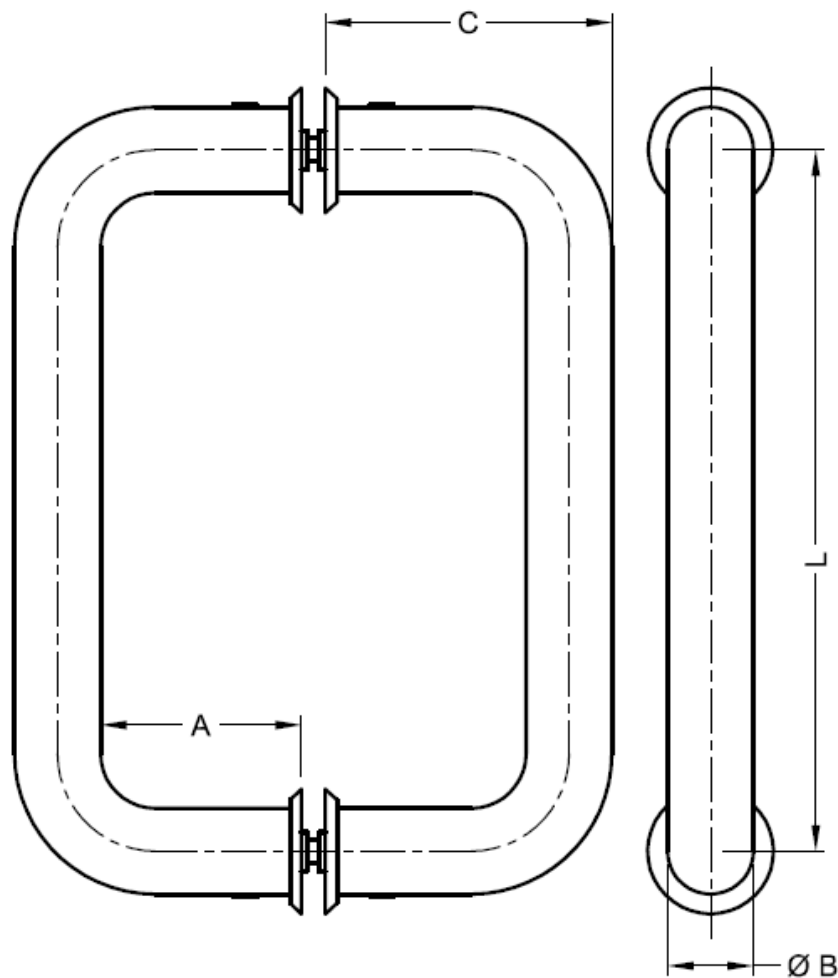


FIG. 1 D-SHAPE PULL HANDLE

Table 1 Recommended Dimensions and Accessories for D-Shape Pull Handles
(Clauses 3.1.1 and 4.2)

All dimensions in millimetre

SI No.	Handle Details		Studs				Stainless Steel Washer			LDPE Washer					Grub Screw	
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
	ØB	L	D	E	F	G	H	T	J	K	M	N	O	P	Q	R
i)	19	150 to 450	Ø 11	110	17	M8	Ø 23	Ø 8	1	Ø22	Ø 10	Ø 8	5.5	1.5	M5	5
ii)	22	150 to 600	Ø 11	110	17	M8	Ø 27	Ø 8	1	Ø25	Ø 10	Ø 8	5.5	1.5	M6	6
iii)	25	200 to 900	Ø 11	110	17	M8	Ø 27	Ø 8	1	Ø25	Ø 10	Ø 8	5.5	1.5	M6	6
iv)	32	300 to 2 400	Ø 11	110	17	M8	Ø 41	Ø 8	1	Ø37	Ø 10	Ø 8	5.5	1.5	M6	8
v)	38	300 to 2 400	Ø 11	110	17	M8	Ø 41	Ø 8	1	Ø37	Ø 10	Ø 8	5.5	1.5	M6	8
NOTE — 1.2 mm thick material shall be used for 19 mm to 32 mm diameter pull handles and 1.5 mm thick material for 38 mm diameter pull handle.																

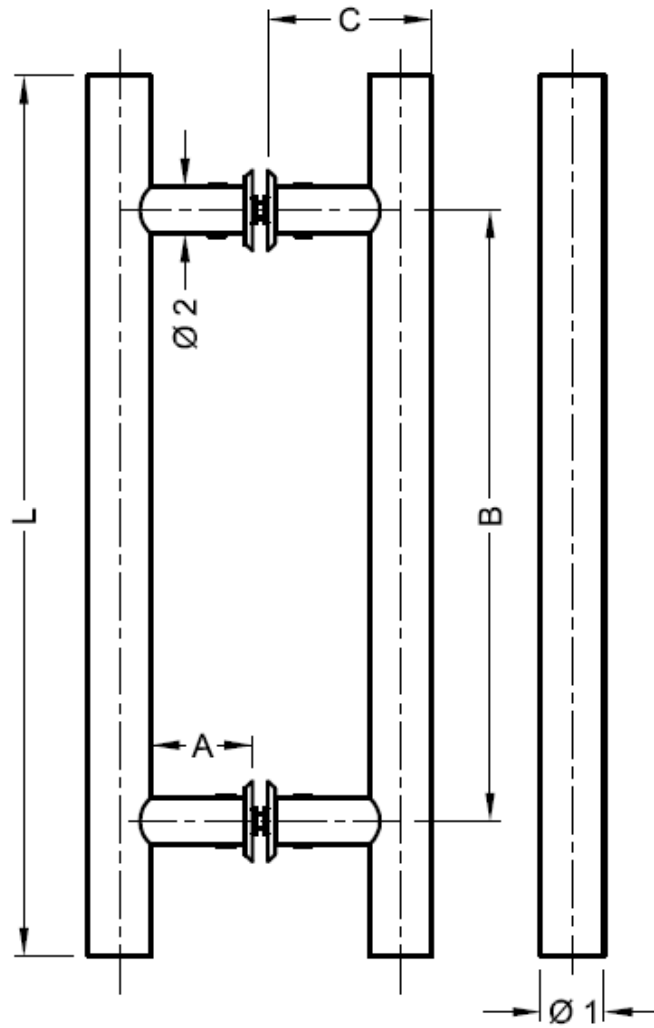


FIG. 2 H-SHAPE PULL HANDLE

Table 2 Recommended Dimensions and Accessories for H Shape Pull Handle

(Clauses 3.1.2 and 4.2)

All Dimensions in millimetre

Sl No.	Handle Details				Fitting Top				S.S. Washer			LDPE Washer					Set Screw	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
	Ø 1	Ø 2	L	B	D	E	F	G	H	T	J	K	M	N	O	P	Q	R
i)	22	19	250 to 350	L-50 mm	Ø 11	110	17	M8	Ø 23	Ø 8	1	Ø 22	Ø 10	Ø 8	5.5	1.5	M5	5
ii)	25	22	350 to 600	L-50 mm	Ø 11	110	17	M8	Ø 27	Ø 8	1	Ø 25	Ø 10	Ø 8	5.5	1.5	M6	6
iii)	32	25	600 to 900	L-50 mm	Ø 11	110	17	M8	Ø 27	Ø 8	1	Ø 25	Ø 10	Ø 8	5.5	1.5	M6	6
iv)	38	32	900 to 2 400	L-50 mm	Ø 11	110	17	M8	Ø 41	Ø 8	1	Ø 37	Ø 10	Ø 8	5.5	1.5	M6	8
NOTE — 1.2 mm thick material shall be used for 19 mm to 32 mm diameter pull handles and 1.5 mm thick material used for 38 mm diameter pull handle.																		

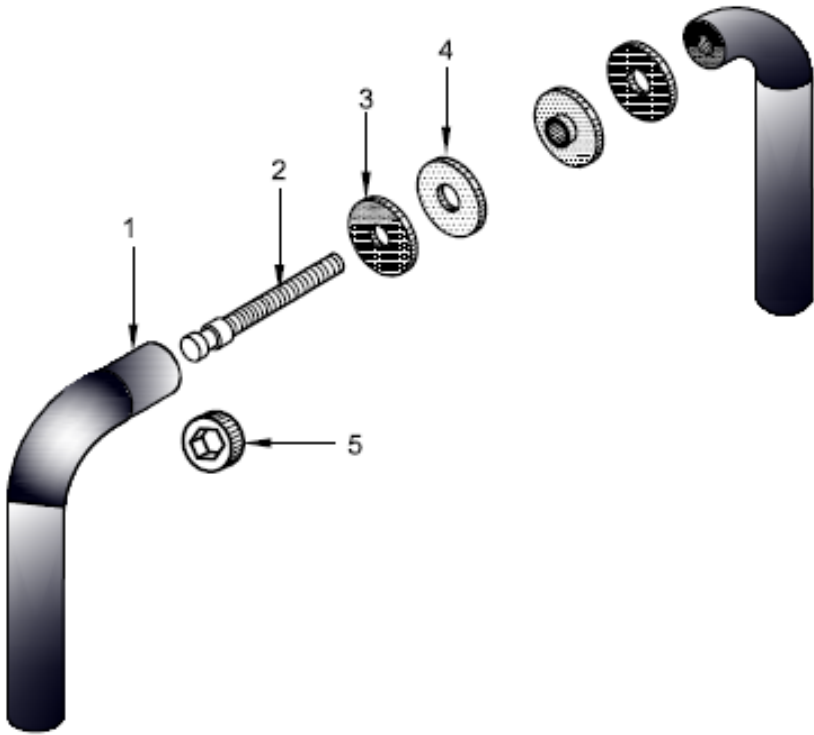


FIG. 3 TYPICAL DETAILS OF FITTING ACCESSORIES FOR D-SHAPE PULL HANDLE (EXPLODED VIEW)

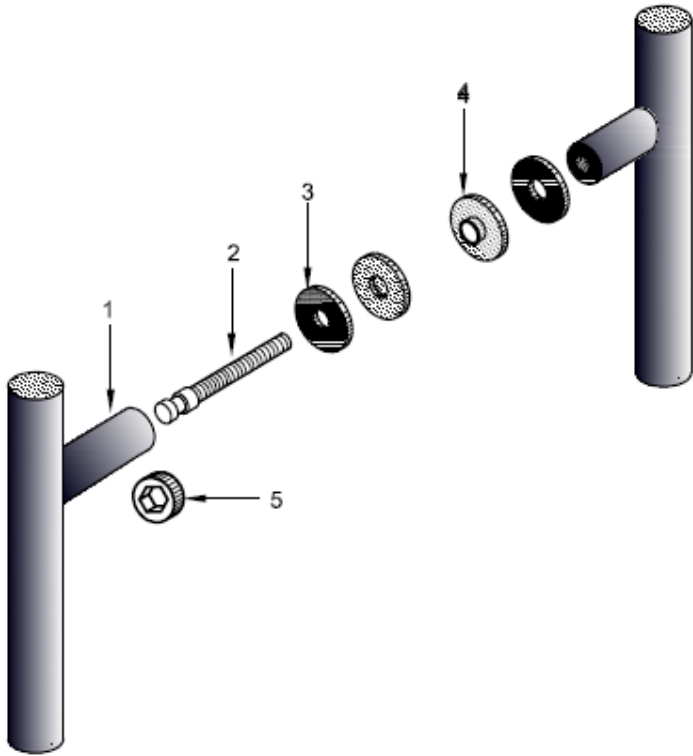
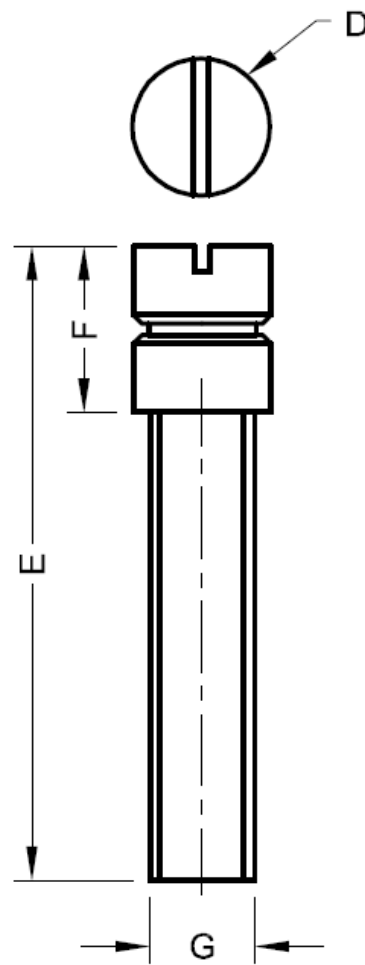
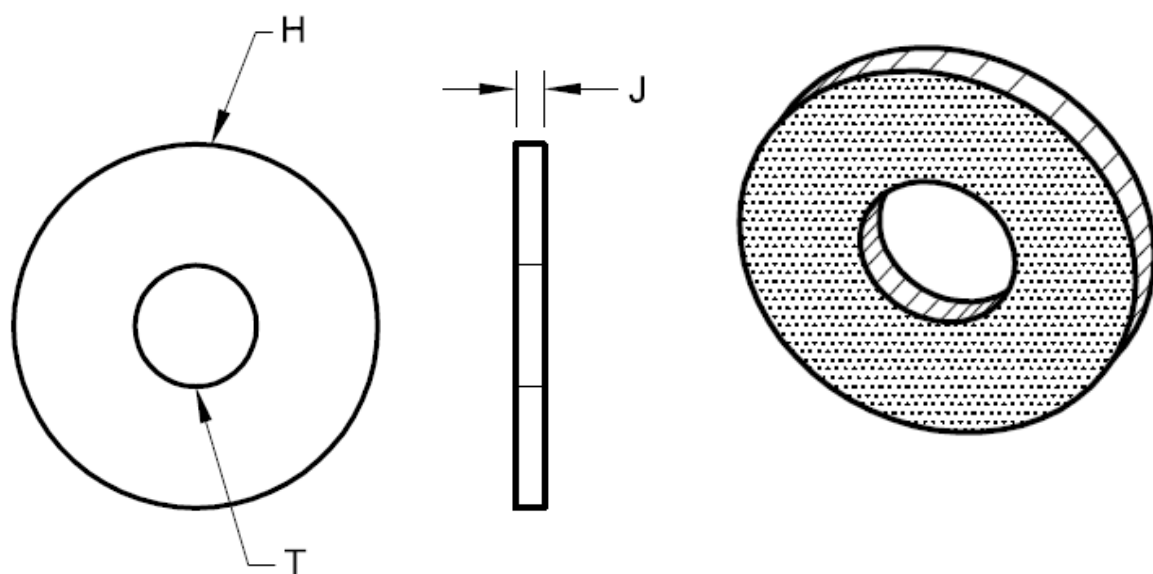


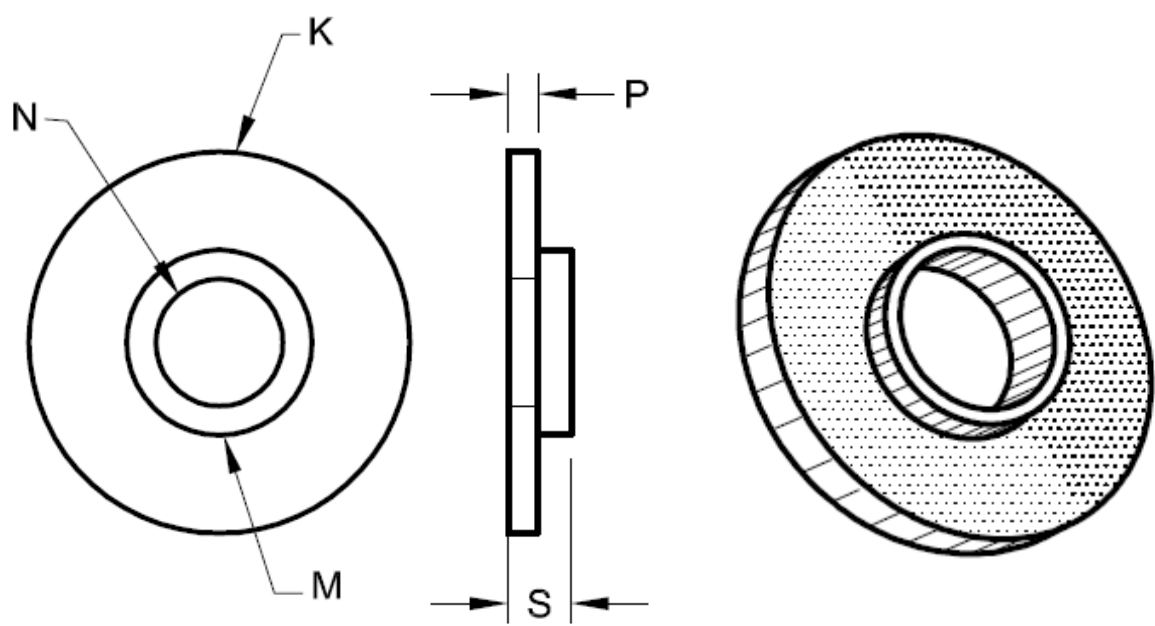
FIG. 4 TYPICAL DETAILS OF FITTING ACCESSORIES FOR H-SHAPE PULL HANDLE (EXPLODED VIEW)



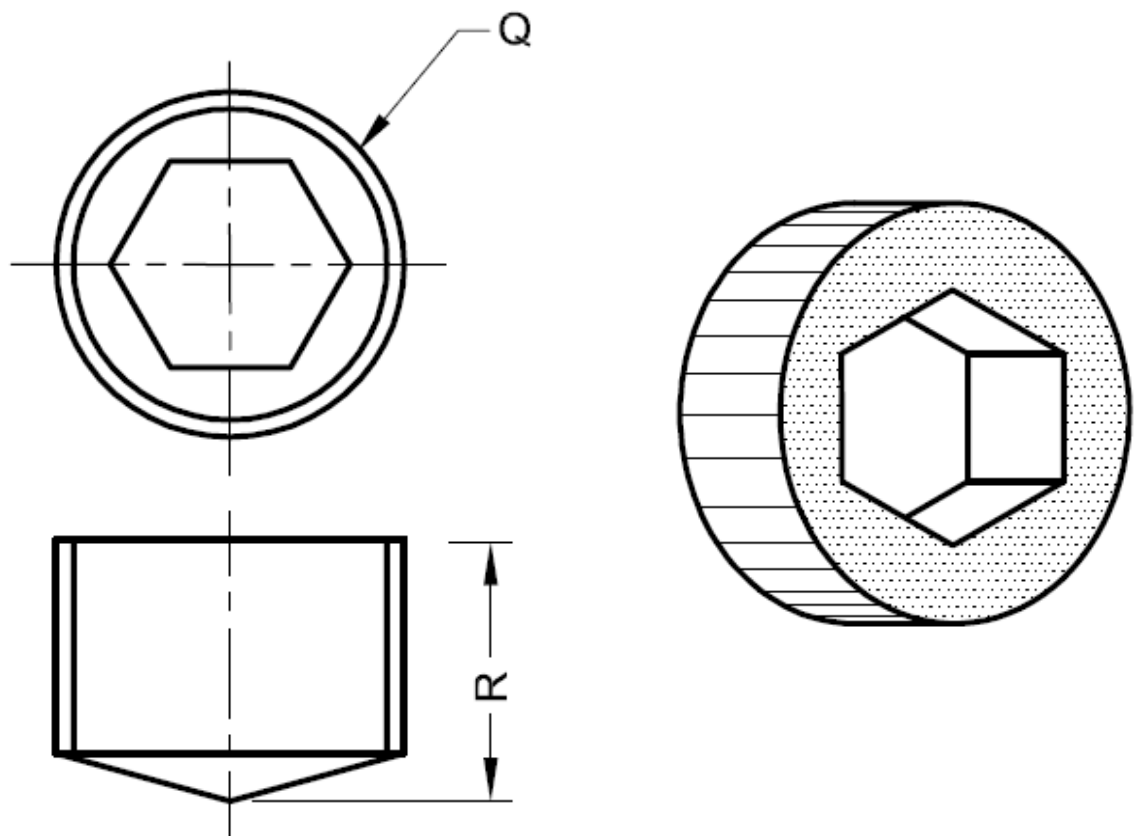
5A TYPICAL DETAILS OF STUDS



5B TYPICAL DETAILS OF STAINLESS STEEL WASHER



5C TYPICAL DETAILS OF LDPE WASHER



5D TYPICAL DETAILS OF GRUB SCREW

FIG. 5 TYPICAL DETAILS OF FITTING ACCESSORIES OF PULL HANDLE

4.4 Finish

Unless ordered otherwise, the finish shall be as follows:

- a) *Type 1* — Bright satin or nickel or chromium plated finish on steel or zinc or zinc-alloys or copper or copper alloys or aluminium or aluminium alloys as per IS 1068.
- b) *Type 2* — Copper oxidized finish as per IS 1378 on zinc or zinc-alloys or steel.
- c) *Type 3* — Linished satin finish or buffed glossy finish on stainless steel handles
- d) *Type 4* — Bright, matt or dyed aluminium anodized finish as per IS 1868 not less than Grade AC 10.

5 PERFORMANCE REQUIREMENTS

5.1 Corrosion Resistance

Pull handles shall not show any sign of corrosion or any black spot, when tested for neutral salt spray test as per IS 9844. The grade of service conditions of pull handles as shall be:

- | | |
|--|---------|
| a) Grade 1 (low corrosion resistance) | : 24 h |
| b) Grade 2
(moderate corrosion resistance) | : 48 h |
| c) Grade 3 (high corrosion resistance) | : 96 h |
| d) Grade 4
(very high corrosion resistance) | : 240 h |

5.2 Durability

5.2.1 Pull handles shall be tested for durability for 5 000 numbers of cycles in accordance with Annex A as per the following category of use:

- | | |
|--------------------------------|-------------------------------|
| a) Category 1
(Light duty) | : Endures force up to 100 N |
| b) Category 2
(Medium duty) | : Endured force up to 250 N |
| c) Category 3
(Heavy duty) | : Endures force up to 600 N |
| d) Category 4
(Severe duty) | : Endures force up to 1 200 N |

After the test

- 1) the pull handle assembly shall not show any sign of damage;

- 2) the pull handle fixings shall not show any sign of loosening or damage; and
- 3) any residual deformation of the pull handle, as measured in accordance with Annex A, shall be not greater than 1 mm.

5.2.2 The durability test shall be carried out once in six months or in case of any change in shape, size or material.

6 SAMPLING AND CRITERION FOR CONFORMITY

The method of sampling the pull handles and the criteria for conformity shall be as given in Annex B.

7 MARKING

7.1 Each pull handle shall be legibly and indelibly marked with the following:

- a) Manufacturer's name or trade-mark; and
- b) Type and size of the pull handle.

7.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

8 PACKING

Pull handles shall be suitably packed in cartons. Each carton shall be legibly and indelibly marked with the following:

- a) Manufacturer's name and registered trade-mark, if any;
- b) Type of material (grade of material as per corresponding Indian Standard) and finish;
- c) Type and size of pull handle;
- d) Grade (of corrosion resistance);
- e) Durability category;
- f) Quantity; and
- g) Date of manufacture and batch/lot number.

ANNEX A

(Clause 5.2)

METHOD OF DURABILITY TEST

A-1 GENERAL

A-1.1 Control the ambient temperature of the test environment throughout the test from 15°C to 30°C. Ensure that the testing environment is draught free.

A-1.2 The following tolerances on measured values, except where otherwise defined shall be applicable:

- a) angular position, in degrees : $\pm 2^\circ$
- b) force, in newtons : ± 2 percent
- c) length, in millimetres : ± 2 percent
- d) time, in seconds : ± 1 s

A-1.3 Determine measurements using measuring instruments with an accuracy of ≥ 1.5 percent. Include,

as part of the test equipment, a means for recording the number of test cycles performed.

A-2 APPARATUS

A-2.1 The test apparatus shall comprise a mounting block and ram as shown in Fig. 6.

A-2.2 Mounting block shall be of plywood made of 19 to 23 veneers with overall thickness of 40 ± 1 mm. The mounting block shall be of a suitable size to accept the test sample. The block shall extend at least 30 mm beyond the extreme dimensions of the sample in all directions, including any mounting plate or fixture that forms a part of the pull handle assembly.

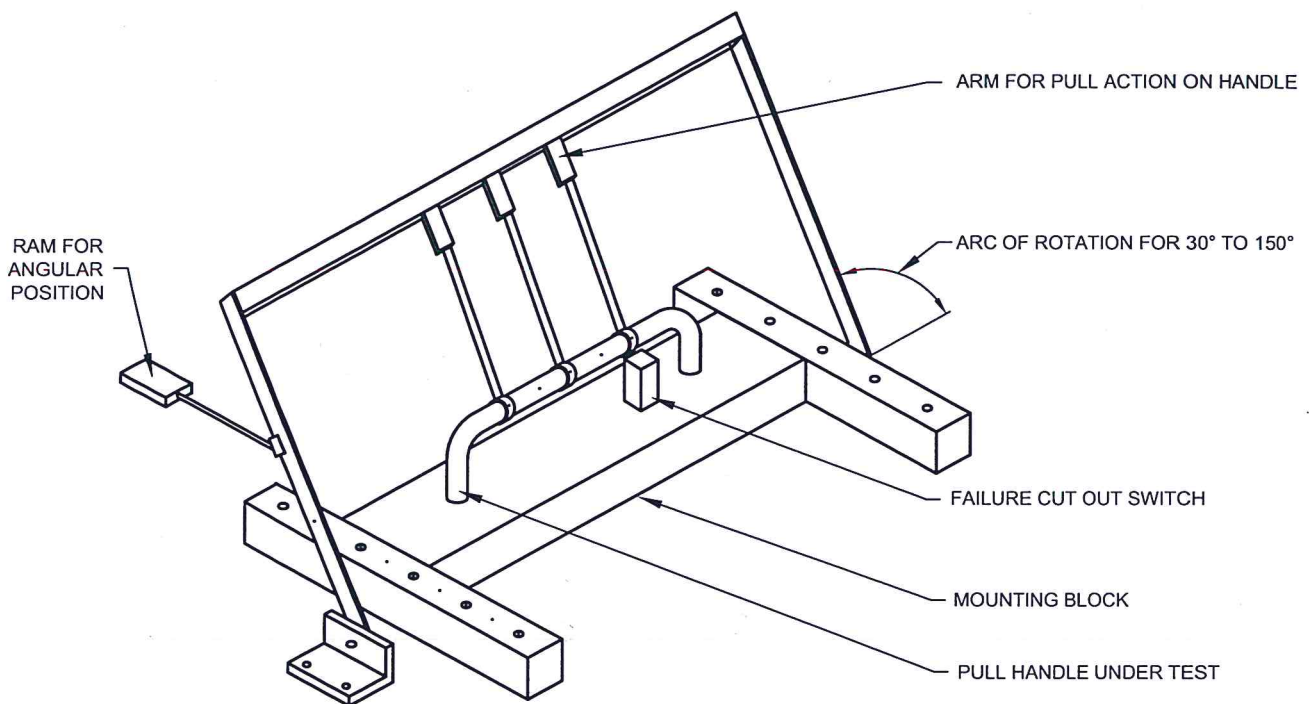


FIG. 6 TYPICAL TEST APPARATUS FOR DURABILITY TEST

A-2.3 Ram, comprising a hydraulic load applicator, or similar loading device, which can exert the test forces up to required category of application.

Three pull action rams on the test rig shall be connected in such a way that each can be operated independently. The pull action rams shall be capable of operating at 3 s intervals. An additional angular positioning ram shall be positioned to enable the three pull action rams to be rotated from a 30° position to a 150° position, in increments of 30°.

A-3 PROCEDURE

A-3.1 Preparing the Test Specimen

Mount the test specimen on the test rig using the fixings with which the manufacturer intends the pull handle to be used.

NOTE — The pull action rams of the test rig are not attached to the test specimen at this stage of the durability.

A-3.2 Pre-test Measurements

Measure the gap between the inner face of the pull handle and the face of the test block, at the mid-point of the handle.

A-3.3 Method of Force Application

A-3.3.1 General

- a) Select the force that a pull action ram exerts on the test specimen as per the category declared.
- b) Connect the pull action ram(s) to the test specimen and subject the test specimen to the force in accordance with A-3.3.2 or A-3.3.3, whichever is applicable.

A-3.3.2 Method of Test for Pull Handles < 200 mm in Length

Connect the middle pull action ram to the centre of the pull handle test specimen. The two outer pull action rams are not connected to the test specimen. When it is not possible to connect the middle pull action ram to the centre of the pull handle, for example pull handles with one central fixing point, connect the middle pull action ram to either side of the fixing point in such a way that the load applied by the ram is evenly distributed and avoids excess stress. In such cases, record the precise position of the middle pull action ram.

Index the angular positioning ram to the 30°, 60°, 90°, 120° and 150° position and apply a force without shock according to the required category of use. Maintain the force for 3 s. Repeat the test cycle 5 000 times.

A-3.3.3 Method of Test for Pull Handles > 200 mm in Length

Connect the three pull action rams to the pull handle and ensure that the two outer pull action rams are positioned 50 mm from each end, and the remaining pull action ram is centrally positioned on the handle.

When it is not possible to connect the two outer pull action rams 50 mm from each end of the pull handle, for example for cranked pull handles, ensure that the two outer pull action rams are connected to the next nearest practicable position. In such cases, record the precise position of the outer two pull action rams.

When it is not possible to connect the middle pull action ram to the centre of the pull handle, for example for pull handles with one central fixing point, connect the middle pull action ram to either side of the fixing point in such a way that the load applied by the ram is evenly distributed and avoids excess stress. In such cases, record the precise position of the middle pull action ram.

Index the angular positioning ram to the 30°, 60°, 90°, 120° and 150° position and apply a force without shock according to the required category of use, each of the three pull action rams applying the force in sequence. Maintain the force from each pull action ram for 3 s. Repeat the test cycle 5 000 times.

A-3.3.4 Post-test Measurement

Measure the gap between the inner face of the pull handle and the face of the test block, at the mid-point of the handle.

A-4 CALCULATION OF RESULTS

Determine the extent of deformation caused on the pull handle by calculating the difference between the values determined.

A-5 POST-TEST ASSESSMENT

After the testing, check the sample for the following points:

- a) The pull handle assembly shall not show any sign of damage;
- b) The pull handle fixings shall not show any sign of loosening or damage; and
- c) The deformation of the pull handle shall be not greater than 1 mm.

ANNEX B*(Clause 6)***SAMPLING AND CRITERIA FOR CONFORMITY****B-1 LOT**

In any consignment, all the Pull Handles of the same shape, size and finish, manufactured from similar materials under identical conditions of manufacture, shall be grouped together to constitute a lot.

Pull handles shall be selected from a lot at random. In order to ensure the randomness of selection, the procedure given in IS 4905 shall be followed. The number of pull handles to be selected from the lot depends upon the lot size and shall be in accordance with Table 3.

B-2 NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

B-2.1 Pull handles selected in accordance with col 2 and col 3 of Table 3 shall be tested for dimension

requirements (3). The lot shall consider pass in the dimensional requirements if the maximum number of defectives found is less than or equal to the number given in col 4 of Table 3.

B-2.2 The lot which has been found as conforming to the **B-2.1** shall then be tested for performance test (5). For this purpose, the number of pull handles to be selected shall be in accordance with col 2 and col 5 of Table 3. The lot shall be considered as conforming to performance test if no defective is found.

B-2.3 The lot shall be considered as confirming to the requirements of the specification if **B-2.1** and **B-2.2** are satisfied.

Table 3 Scale of Sampling and Criterion for Conformity*(Clause B-2)*

SI No.	Lot Size	Sample Size for Dimensional Requirements	Acceptance No.	Sample Size for Performance Test
(1)	(2)	(3)	(4)	(5)
(i)	Up to 500	50	0	1
(ii)	501 to 2 000	100	1	1
(iii)	2 001 to 5 000	300	2	2
(iv)	5 001 and above	400	3	2

ANNEX C*(Foreword)***COMMITTEE COMPOSITION**

Builder's Hardware Sectional Committee, CED 15

<i>Organization</i>	<i>Representative(s)</i>
In Personal Capacity (1421, Sector A, Pocket B & C, Vasant Kunj, New Delhi 110070)	SHRI B. MAJUMDAR (Chairman)
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Builders' Association of India, New Delhi	SHRI NEERAV PARMAR SHRI H. S. PSRICHA (<i>Alternate</i>)
Building Materials and Technology Promotion Council, New Delhi	SHRI C. N. JHA SHRI PANKAJ GUPTA (<i>Alternate</i>)
Central Public Works Department, New Delhi	SHRI M. K. MALIK SHRI DIVAKAR AGRAWAL (<i>Alternate</i>)
CSIR-Central Building Research Institute, Roorkee	SHRI ASHOK KUMAR SHRI S. K. NEGI (<i>Alternate</i>)
D P Garg and Company Pvt Ltd, Noida	SHRI S. M. GARG SHRI R. C. MALHOTRA (<i>Alternate</i>)
Delhi Development Authority, New Delhi	CHIEF ENGINEER (NZ) S. E. (CIVIL CIRCLE-13) DWARKA (<i>Alternate</i>)
Dormakaba India Pvt Ltd, New Delhi	SHRI MANAV GULATI SHRI MANOJ (<i>Alternate</i>)
Godrej and Boyce Mfg. Co. Limited, Mumbai	SHRI KSHITIJ R. GAIKAR SHRI VINAYAK G. NALGIRKAR (<i>Alternate</i>)
Hindalco Industries Limited, Sonbhadra	SHRI JAYANTA RANA SINGH (R & D) DR SAIKAT ADHIKARI (<i>Alternate</i>)
Hettich India Pvt Ltd, Mumbai	SHRI VIRENDRA KUMAR SHRI PANKAJ PANCHAL (<i>Alternate</i>)
Intertek India Pvt Ltd, Gurugram	SHRI POORNESH KUMAR CHATURVEDI SHRI GARISH MALHOTRA (<i>Alternate</i>)
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Kich Architectural Products Pvt Ltd, Rajkot	SHRI BHAVDEEP K. NAKUM SHRI ANIL VANJANI (<i>Alternate</i>)
Lyfssysmac (India) Pvt Ltd, Pune	SHRI ASHIM CHUGH
M C Mowjee and Company Pvt Ltd, Kolkata	SHRI RUSHD MOWJEE SHRI SAJID MOWJEE (<i>Alternate</i>)
MECH (India) Industries, Delhi	SHRI SUDHIR BATRA SHRI SAMEER ARORA (<i>Alternate</i>)
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Ministry of Micro, Small and Medium Enterprises, New Delhi	SHRI U. C. SHUKLA

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School of Planning and Architecture, New Delhi	REPRESENTATIVE
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The Indian Institute of Architects, Mumbai	SHRI ABHIJIT RAY
BIS Director General	SHRI SANJAY PANT, SCIENTIST 'F' AND HEAD (CIVIL ENGINEERING) [REPRESENTING DIRECTOR GENERAL (<i>Ex-officio</i>)]

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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